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A REVISION OF THE NORTH AMERICAN PACHYGASTERINÆ WITH UNSPINED SCUTELLUM (DIPTERA).

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It is not by any means unusual for taxonomic workers in entomology to discover, when classifying genera in families which consist of a large number of closely allied species that characters which they find of considerable value for their purpose, and which apparently are of real generic rank in these groups, are found not in a number of species, but in individual species in other portions of their series. Indeed, the systematist almost invariably finds that by a consistent application of the test of his separating characters throughout a family he has several large groups of species set apart from each other, collectively, by characters the use of which in classifying a certain residue of species—often more closely related biologically than are some of the individuals of the seemingly natural groups which his application of certain rules has defined—will result in a generic separation giving a single species to each genus. I have had this experience in almost every family of insects that I have studied, but have no remedy to suggest, since without a knowledge of the life history of the species we are often unable to decide upon the limits of genera except arbitrarily, or—which amounts to the same thing—by a consideration of structural details of the adults. In every order, differences of opinion exist regarding the status of genera, and still more commonly in the case of species, and, apart from

those differences which arise between taxonomists because of their personal relations, it is often impossible to decide which is the correct attitude regarding certain disputed points.

It has been my task lately to identify certain species of Stratiomyiidae contained in the collection of the Illinois State Laboratory of Natural History, and in doing this I have been confronted with a situation such as I have briefly outlined above. It is not my intention to deal with species other than those included in that group of the subfamily Pachygasterinae which has the scutellum without distinct thorns, although mention is made of certain analogous cases in other genera.

In addition to the taxonomic details given herein, I have summarized such biological data as I have been able to obtain.

The genus *Pachygaster* Meigen has been subdivided by Austen (*Neopachygaster*), Coquillett (*Zabrachia*), and Kertész (*Eupachygaster*), or at least species considered by other authors as belonging to *Pachygaster* sens. lat., have been removed to other genera by the authors just mentioned. Austen erected the genus *Neopachygaster** to receive *Pachygaster meromelaena* Perris, considered by Verrall† as synonymous with *P. orbitalis*. Austen distinguished this genus from *Pachygaster* by the separated eyes in the male and the fact that the posterior orbits are not produced in the form of a prominent ridge in either sex. It is, to my mind, a weakly defined genus, and it has been rejected by Verrall in the work already referred to. Whether it is expedient to retain it is a point upon which there is ground for diversity of opinion. Coquillett erected the genus *Zabrachia*‡ for the reception of a species which he described under the name *polita*. This genus he distinguished from *Pachygaster* and its allies by the simple third vein. Though uncertain as to whether the species is or is not synonymous with *Pachygaster minutissimus* Zetterstedt, I am inclined to the opinion that they are identical; but in the absence of European examples of the latter I refrain from expressing a decided opinion. It is, however, pertinent to point out that Kertész has placed *minutissimus* in *Zabrachia* in a recent paper on the genera, and that English writers have suggested that the species

*Ent. Monthly Mag., Vol. 37, 1901, p. 245.

†British Flies, Vol. 5, 1909, pp. 66 and 75.

‡Bull. 47 N. Y. State Mus., 1901, p. 585.

might be considered as generically distinct from both *Pachygaster* and *Neopachygaster*. Dr. Sharp's suggestion to this effect is disposed of by Verrall in dealing with *Neopachygaster*, and in his notes under *P. tarsalis* he mentions a specimen of that species which has the fork of the third vein "so indistinct as to be almost absent." In this connection it seems reasonable to indicate that in several genera in this family the absence or presence of the fork of the third vein is not considered as of more than specific value. This is noticeably true in *Nemotelus* and *Oxycera*, where one finds that even in recent papers the presence or absence of the fork is not used even as a primary key character for the species. To be consistent, one who accepts this character as of generic value in *Pachygasterinae* would almost as certainly be required to accept it as such in the other subfamilies; or, conversely, since this character is considered as of specific value only in genera which contain a much larger number of species than does *Pachygaster* sens lat., it is inconsistent to accept it as of generic value in the latter.

There is, however, a slight but fundamental difference between *Zabrachia* and such genera as *Nemotelus* and *Oxycera*, the two latter having the third vein differently formed. In this connection see notes on *Zabrachia*.

The structure of the head of the male, in which the eyes are distinctly separated, is the only character of importance in the separation of *Neopachygaster* from *Pachygaster*, which latter has the eyes of the male contiguous, and it is practically impossible for any one but an expert to separate the females of the genera.

The last subdivision of the old genus is that of Kertész, referred to in a subsequent part of the present paper, by which the genus *Eupachygaster* was erected to receive *Pachygaster tarsalis* Zetterstedt.

I have drawn up a key to the genera of North American *Pachygasterinae* as limited in the heading to this paper, which should make the situation clear.

KEY TO PACHYGASTERINAE WITH UNARMED SCUTELLUM.

1. Third vein simple.....2
Third vein furcate.....3
2. Third (complex) antennal joint elongate.....*Berkshiria*
Third antennal joint short, dislike or slightly reniform.....*Zabruchia*
3. Arista subplumose, slender; third antennal joint round; eyes of male contiguous
Lophoteles
Arista densely or slightly pubescent, or bare, rarely slightly thickened; third antennal joint elongate or dislike; eyes of male contiguous or distinctly separated.....4
4. Scutellum directed upward, triangular, terminating in a short obtuse process.5
Scutellum regularly rounded apically, or with a distinct transverse suture or depression before the apex which gives to the scutellum the appearance of having a raised post-marginal rim.....6
5. Third antennal joint dislike, arista longer than entire antenna; eyes of male narrowly separated.....*Eucynipimorpha*
Third antennal joint elongated, arista shorter than antenna; eyes of male contiguous.....*Cynipimorpha**
6. Third antennal joint elongate; eyes of male contiguous above antennæ, the facets slightly decreasing in size as they near lower margin but without any sharp line of division; scutellum with distinct marginal rim or ridge..
Johnsonomyia
Third antennal joint dislike.....7
7. Eyes of male contiguous; antennæ in both sexes inserted distinctly below middle of profile.....*Pachygaster*
Eyes of male separated; antennæ in both sexes inserted at or near middle of head in profile.....8
8. Scutellum much swollen, and with a distinct rim, the margin with a number of small wartlike protuberances; frons with a distinct incised median line from anterior ocellus to middle.....*Eupachygaster*
Scutellum slightly swollen, with a slightly defined rounded margin which is not armed with protuberances; frons without median incised line from anterior ocellus to middle.....*Neopachygaster*

Berkshiria Johnson.

This genus was erected for the reception of a single species, *albistylum* Johnson.†

The locality of the species is Austen's Brook, Chester, Mass., collected May 28, 1912, by C. W. Johnson.

The following is a copy of the original description.

“BERKSHIRIA gen. nov.”

“Third joint of the antennæ oblong, about double the length of the first and second taken together; third joint with five annuli, the basal one broader than the others; arista terminal, style-like, about as long as the entire antenna; front with two longitudinal ridges; transverse suture deeply impressed; scutellum large, rounded, with a broad depressed margin; third longitudinal vein without the anterior branch; ends of the terminal joints of the tarsi with bristle-like hairs. Type *B. albistylum* sp. nov.”

*See under *Eucynipimorpha*.

†*Psyche*, Vol. 22, 1914, p. 158.

“*Berkshiria albistylum* sp. nov.”

“Black; front shining, the two ridges forming deep central and orbital grooves, ocelligerous tubercle prominent; face receding, the orbits white; antenna yellow, arista white with its basal fourth black. Thorax sparsely covered with a whitish pubescence; humeri angulate with a small yellow spot at each point, a raised collar extending between the humeri, and a blunt spine on each side before the base of the wing. Abdomen broad, about double the width of the thorax, the five segments shining, sparsely covered with whitish hairs. Halteres white, base of the knobs and stems brown. Legs black, knees, tips of the tibiae and the tarsi yellow, the last two joints of the latter brownish. Wings hyaline, veins yellowish, three veins extending from the discal cell. Length, 4 mm.”

I have not seen the species. Except in the absence of the fork of the third vein it must very closely resemble *Johnsonomyia aldrichi*, described in the present paper.

Nothing is known of the early stages, and no indication of the sex of the type is given in the description.

Zabrachia Coquillett.

This genus was erected for the reception of a single species, *polita* Coquillett.* It is distinguished from all other North American genera of this group of the subfamily except *Berkshiria* by the absence of the fork of the third vein. From *Berkshiria* it is distinguished by the structure of the antennae, those of *Zabrachia* being short and the third joint disc-like, while in *Berkshiria* they are elongated, and the third joint noticeably longer than broad.

Zabrachia polita Coquillett.

Male.—Glossy black. Antennae yellow, arista brown. Legs yellow, coxae and femora black, apices of latter yellow. Wings clear, veins grayish. Halteres black.

Head in profile (Fig. 3) slightly higher than long, eyes covering the entire side, ocellar region slightly raised; eyes bare, contiguous above, leaving only the ocellar and supra-antennal triangles visible, upper eye-facets distinctly larger than lower, separated by a distinct transverse line slightly above base of antennae; antennae short, complex joint disclike; arista short, bare, and hairlike; proboscis of moderate size. Mesonotum finely and rather closely punctured, surface hairs very short, dark; scutellum with disc as that of mesonotum, a distinct depression near margin, giving it the appearance of having a marginal rim, the base appreciably swollen, the whole in profile with an upward

*Bull. 47, N. Y. State Mus., 1901, p. 585.

direction. Abdomen more glossy than mesonotum and without distinct punctures, the surface hairs sparse and slightly longer than those of thorax. Legs slender. Third vein ending as far before apex of wing as its own length; distance from apex of stigma to apex of third vein slightly longer than the preceding section of costa; apex of discal cell very slightly proximad of apex of stigma (Fig. 6).

Female.—Differs in color from the male only in having the halteres yellow.

Structurally, the head differs from that of the male more than in other genera dealt with in this paper. The frons is broad, over one third the head-width, raised, with a central incised line which broadens above antennæ, giving the frons the appearance of having a raised, rounded ridge on each side; postocular orbits prominent, visible from vertex to lower margin; cheeks distinct; eyes much smaller than in the male, facets of equal size throughout; profile as Figure 4. Thorax as in male, the scutellum with less noticeable rim.

Length, 2.5-3 mm.

Originally described from Saranac Inn, N. Y. Subsequently recorded by C. W. Johnson as having been reared from larvae found under the bark of pine logs at Auburndale, Mass., March 26, 1905.* The imagines emerged between May 12 and June 20. Two specimens kindly submitted by Mr. Johnson bear the date of May 18, 1905. One of the specimens has the empty pupal skin attached to the pin, and is figured herewith (Figs. 9 and 10).

Comparison of the pupa of this specimen with those figured by Verrall and here reproduced shows that while they are similar in general appearance, they may be separated by the disposition and length of the bristles. (See Figs. 11 and 12).

I have a suspicion that this species may be synonymous with *minutissima* Zetterstedt, a European species which has been reared from larvæ found under bark of pine trees, but Verrall's description† gives the eyes of the male as longer than deep, which is not the case with the specimens before me. I have no European examples for comparison, so leave the matter as it is for the present. It is pertinent to remark, however, that Verrall in his notes of the species indicates that the head of the only English male specimen he had seen is quite as deep as long—at variance with his description. Dr. D. Sharp has reared *minutissimus* from larvæ found under bark of *Pinus sylvestris* at Nethy Bridge, Scotland. The species is found in Scandinavia, France, Denmark, Austria and Germany,

**Psyche*, Vol. 13, 1906, p. 3.

†*British Flies*, Stratomyidæ, Vol. 5, p. 67.

and is associated with *Abies* and *Pinus*. Perris reared it from larvæ found on *Pinus maritimus* in the burrows of *Tomicus* and *Hylurgus*, and gives a full description of the stages, with figures,* under the name *Pachygaster pini* Perris.

Verrall's contention that this genus is not a valid one because of the possibility of the fork of the third vein becoming obsolete in occasional specimens of other species which ought to have it present can not be entertained, as the course of the veins in *Zabrachia* precludes the possibility of its ever being furcate, and is quite a different case from that of the other genera cited.

Lophoteles Loew.†

The type species of this genus was described from specimens taken on the Polynesian island of Radak. Subsequently Williston described a species, *pallidipennis*, from Atoyac, Vera Cruz, Mexico, which he considered congeneric.‡ I have some doubt as to the generic position of Williston's species, which I have not seen. The description of the antenna is not clear enough to permit one's forming an opinion as to its structure, but the fact that the arista is densely plumose is demonstrated both in the description and in the figure. A copy of Williston's description is given below. Williston was not certain of the sex of his specimen.

Lophoteles pallidipennis.

"*Female*.—Head black, covered with whitish dust, with the exception of a slender median line and the lowermost portion, which are shining. At the vertex the eyes are separated by the ocelli, the front gradually widening anteriorly. Antennæ black, the first two joints yellow; arista densely pubescent, appearing almost like a solid mass, in length equal to about twice that of the first three joints together. Thorax deep black, moderately shining, the color mostly concealed beneath silvery tomentum, which is arranged in slender stripes, leaving the black color apparent between them. Scutellum subtriangular, the middle portion of the margin produced into a thin edge, upon which a number of minute points are visible; the basal part uniformly and thickly silvery-tomentose, the apical portion opaque black. Abdomen black, for the most part concealed beneath a dense silvery tomentum. Legs light yellow; all the femora, except their tip, black. Wings hyaline, the veins yellow and not at all stout. Length $3\frac{1}{2}$ millim."

*Ann. Soc. Ent. France, 1870, p. 210.

†Berl. Ent. Zeitschr., 1858, p. 110.

‡Biol. Centr. Amer., Diptera, Vol. I, 1901, p. 250.

Eucynipimorpha, n. gen.

This genus is erected for the reception of the species described by Williston as *Cynipimorpha minuta*. It differs from *bilimeki* in the form of the antennæ. In *Cynipimorpha** the antennæ are elongate, the third joint exceeding in length that of the first and second combined; the second joint is produced, thumb-like, on the upper inner side, and the arista is slender, not longer than third joint, and bare. In *minuta* the antennæ are short, and the third joint is transversely ellipsoidal, and the arista very slender and distinctly longer than the entire antenna. The eyes of the male of *C. bilimeki* are contiguous, while those of *minuta* are narrowly separated. Kertész has pointed out the differences between the species and suggested that *minuta* is probably a new genus.†

Type of genus, *Cynipimorpha minuta*.‡

Williston's description of *minuta* is as follows:

"*Male*.—Eyes separated by the ocelli, gradually becoming wider below; ocelli situated upon a tubercle, otherwise the front is plane. First two joints of the antennæ very short; third joint transversely ellipsoidal, finely roughened, with the very slender arista springing from the upper front part. Face silvery-white, not at all projecting in profile; the oral opening extends to the root of the antennæ, which arise from near the middle of the head, as seen in profile. Thorax wholly black; mesonotum in the middle clothed with dense, short, silvery pubescence, somewhat variable in different reflections, the sides with a patch of sparse, coarser, silvery tomentum. Knob of the halteres white. Abdomen black, moderately shining, broader than the thorax and only a little longer than wide; near the tip with some sparse white pile. Legs light yellow; the femora, except the tip, nearly black. Wings hyaline, neuration as described for *C. bilimeki*, Brauer. Scutellum triangular, obtusely pointed, the basal portion with white pubescence. Length $2\frac{1}{2}$ millim."

Kertész's genus *Lyprotomyia*§ is closely allied to both *Cynipimorpha* and *Eucynipimorpha*, differing from the former in having the antennæ stout and the third joint disc-like, as well as in other respects. From *Eucynipimorpha* it is distinguished by the elongated head, which is distinctly longer than high; the slender thorax; very erect, almost vertical,

*See Brauer, Die Zweifl. des Kaiserl., Mus. zu Wien, Vol. 41, 1882, p. 75.

†Ann. Mus. Nat. Hung., Vol. 5, 1908, p. 344.

‡Biol. Cent. Amer., Diptera. Vol. 1, p. 252.

§Ann. Nat. Mus. Hung., Vol. 6, 1909, p. 391.

thornlike scutellum; the basally constricted abdomen; and the very slender legs. The general habitus of the species *formicæformis* is entirely different from that of the two other genera under discussion.

The known distribution of the three genera is as follows:

Eucynipimorpha minuta Williston, Chilpancingo in Guerrero, Mexico.

Cynipimorpha bilimeki Brauer, Cuernavaca, Orizaba, Mexico.

Lyprotomyia formicæformis Kertész, Meshagua, Urubambafloss, Peru.

Nothing is known of the life history of any of the genera.

Johnsonomyia, n. gen.

Male.—Eyes contiguous; ocelli on a raised knob; antennæ elongate, flagellum distinctly longer than broad, arista apical, densely short-haired, insertion of antennæ slightly above middle of head in profile; orbits indistinguishable in profile. Scutellum similar to that of *Eupachygaster*. Abdomen short and broad. Apex of stigma proximal of apex of discal cell; third vein forked; discal cell emitting three veins.

Female.—Eyes widely separated above; antennæ rather larger than in male, and arista more conspicuously haired.

Type of genus, *Johnsonomyia aldrichi* n. sp.

Johnsonomyia aldrichi, n. sp.

Male.—Black, shining. Antennæ dark brown, basal two joints of flagellum yellow; arista white, blackish at base; frontal triangle black, with a small silvery pilose spot on each side below; a silvery line extending along eye margin from base of antennæ to posterior orbits; face glossy black; proboscis brownish; hairs on vertex and lower portion of head black. Hairs on thorax black, those on disc appearing slightly brownish when viewed at certain angles. Hairs on abdomen white. Legs blackish-brown, knees, apices of tibiæ, and basal four joints of tarsi yellow. Wings clear, veins yellow. Halteres black, knob grayish brown.

Frontal triangle very small; eyes touching, facets becoming slightly smaller on lower half; antennal flagellum consisting of five joints, arista densely clothed with short hairs; sides of face and the cheeks diverging below; profile as in figure 15. Hairs on disc of mesonotum upright and of moderate length, those on scutellum shorter and very closely placed; thoracic suture very distinct on disc, forming 2 rather conspicuous cavities which run diagonally backward to middle of mesonotum and do not join, being narrowly separated on the median line; outline of scutellum very much like that of *Eupachygaster punctifer*, differing in having the apical production slightly upcurved and the small marginal thorns (4) confined to the apex (Fig. 5). Segments of abdomen closely fused, the divisions hardly perceptible; surface with short decumbent

hairs, each of which is situated in a shallow puncture. Legs normal in form. Venation as in Figure 6 except that the third vein is more elongate and furcate.

Length, 2.5 mm.

Female.—Differs from the male in having the antennæ and the legs, especially the tarsi, paler, and the halteres yellow.

Eyes separated by one-third the head-width; frons with three distinct longitudinal grooves, the central one deep and broad, the lateral pair shallow; ocellar region humplike; antennæ noticeably larger than in male; face and frons, in profile, receding at about the same angle from base of antennæ; posterior orbits narrow; profile as in Figure 14. In other respects as the male.

Length, 3.5 mm.

Type locality, Lafayette, Ind., July 18, 1913 (J. M. Aldrich).

Allotype locality, Victoria, Texas, April 9, 1914, Bishopp No. 3266; submitted by Prof. J. M. Aldrich from material belonging to the U. S. Bureau of Entomology.

I have named the genus in honor of Mr. C. W. Johnson, who has done much good work on Stratiomyiidae, as well as on other families, and the species in honor of the collector, whose efforts resulted in my obtaining for examination the paratype material of *Pachygaster* from the Loew collection in Cambridge, Mass.

Nothing is known of the early stages of this species.

Pachygaster Meigen.*

The genus *Pachygaster* has as its type *atra* Meigen, and as at present limited includes one North American species, *pulcher* Loew. The eyes of the male are contiguous above for a considerable distance, the antennæ are short, the third joint disc-like, the scutellum is without a distinct rim, unspined, and not noticeably swollen, and the third vein is furcate. The female bears a closer resemblance to that of *Zabrachia* than to *Neopachygaster*, but the furcate third vein readily separates it from the former, while the difference in the profile of the head separates it from the latter. The structure of the head of *pulcher* differs considerably from that of *atra*, as is shown by Verrall's figure, but I consider the difference insufficient to warrant their generic separation.

*Illig. Mag., Vol. 2. 1803, p. 266.

Pachygaster pulcher* Loew.

Male.—Glossy black. Antennæ yellow; face with a white pilose line on each side, eyes with three narrow lines across center. Disc of mesonotum with short dark upright hairs. Abdomen shining, a large portion of the disc opaque. Legs yellow, coxæ, and femora except bases and apices blackened. Wings slightly infuscated, especially along the fore margin on basal half, veins brown. Halteres yellow, usually with a dark spot on outer under surface of knob.

Eyes bare, facets of equal size throughout, closely contiguous for a considerable distance above; ocelli on a prominent raised portion; antennæ small, arista bare, hairlike; insertion of antennæ very distinctly below middle of profile; postocular orbits only visible towards lower extremity of head; profile as in Figure 2. Mesonotum finely punctured; scutellum without distinct rim. Abdomen not broader than thorax, narrowed at base, segments more distinct than in other genera, hypopygium small, usually protruded. Legs slender. Third vein ending as far before wing-apex as second branch of media does behind it, the branches of media often fused at apex of discal cell; apex of discal cell distinctly proximad of apex of stigma.

Female.—Agrees in color with the male.

Frons slightly less than one-third head-width, slightly narrowed anteriorly, incised central line weak; antennæ as in male but rather larger; profile as in Figure 1.

Length, 2-3 mm.

The original description gives the District of Columbia as the type locality. I have seen one male from the Museum of Comparative Zoology collection labeled "O. Sacken coll." which bears the locality label West Point. The species has been recorded from New Jersey and the White Mountains, N. H. I have seen a specimen from Opelousas, La., April, 1897, submitted by C. W. Johnson, and others from Lafayette, Ind., July 11 (J. M. Aldrich); and Urbana and Monticello, Ill., June 20 to July 4, 1914 (C. A. Hart and J. R. Malloch).

Only one male of the type series of *pulcher* in the Museum of Comparative Zoology, besides the type specimen, belonged to this species, the others being *Neopachygaster maculicornis* and *Eupachygaster* sp., probably *punctifer*.

Nothing is known of the early stages of our North American species. The European congener, *atra* Meigen, has been reared from decayed *Ulmus* wood. There are records of the species having also been reared from *Populus alba* and *Pinus sylvestris*, but there is considerable doubt as to the correctness of these, as pointed out by Verrall.†

*Berl. Ent. Zeitschr., 1863, p. 10.

†*British Flies*, Vol. V, Stratiomyidæ, p. 71.

The European species *leachii* Curtis, about the generic position of which there is a doubt, has been recorded by Perris at different times as bred from *Boletus* in a hollow oak, from rotten wood from oak and from turnip stems.*

Eupachygaster Kertesz.

I have provisionally placed the following species in *Eupachygaster*, a genus erected by Kieffer for the reception of *tarsalis* Zetterstedt.† It is unfortunate that I am not in possession of both sexes, for this fact prevents me from arriving at a definite opinion regarding the generic status of the species. From *tarsalis* the present species differs in having the antennæ inserted at middle of frons, but I consider this character insufficient alone to permit a generic separation. The specimen I refer to in the notes on the present species as being in the Museum of Comparative Zoology at Cambridge, Mass., has puzzled me. If it is a female it undoubtedly represents a distinct species; whereas if it is a male *punctifer* it is a departure from the rule in having the third antennal joint larger than in the female; and because of the wide frons the species would also be removed from *Eupachygaster*.

Eupachygaster punctifer, n. sp.

Female.—Glossy black. Frons glossy black, with a subopaque M-shaped mark on center, the surface of which is clothed with short silvery pile; lateral margins silvery from lower extremity of the M-shaped mark downward; face brownish, clothed with silvery pilosity; proboscis yellow; antennæ yellow, inner surface from before apex of third joint to apex of sixth distinctly brownish; arista white, yellowish at base. Thorax glossy black, disc with numerous small punctiform groups of silvery scalelike hairs, those on median and submedian lines forming three irregular narrow stripes; scutellum without silvery hairs. Abdomen glossy black, the punctiform groups of silvery hairs present except on disc of first and second segments. Legs pale yellow; fore coxæ black, mid and hind coxæ and all femora except their bases and apices brown. Wings clear; veins and stigma yellow. Halteres brown, knob white except the extreme base.

Frons, at vertex, about one-fourth the width of head, the sides diverging towards antennæ, at its lower extremity one-third the head-width; ocellar region distinctly raised, profile as in Figure 13; antennæ short, apical portion consisting of at least five joints; basal joint of arista short and broad, apical joint elongate, densely clothed with short hairs, so that it appears to be flattened and rather sword-shaped (Fig. 7).

*Ann. Soc. Ent. France, 1870, p. 212, l. c. 1876, p. 180 and p. 193.

†Ter Cong. Intern. d'Entomol. Brux., 1910, p. 31. 1911.

Dorsum of mesonotum and scutellum distinctly punctured; between the groups of silvery hairs on mesonotum, and on the scutellum also, are numerous, less conspicuous, silvery hairs; shape of scutellum when viewed from the side as in Figure 8. Abdomen short and broad, disc of segments punctured as mesonotum. Legs rather stout, surfaces with very short hairs. Fork of third vein slightly sloping towards apex of wing, distance from apex of fork to apex of third less than one-third the distance from apex of stigma to apex of fork.

Length, 3.5 mm.

Type locality, Algonquin, Ill. (W. A. Nason).

A specimen, without locality data, from the Loew collection and placed with the type *Pachygaster pulcher*, has the antennæ considerably larger, the third joint very much deeper than long, the arista slender, with very short pubescence, the silvery pile arranged in irregular narrow stripes instead of punctiform groups; no noticeable silvery pile on abdomen. I am rather inclined to the opinion that this specimen is the female of a distinct species, but because of uncertainty as to the locality from which it was obtained and a disinclination to dissect a specimen which does not belong to me, I am forced to leave the matter in doubt, even as to sex.

Dr. Kertész has described the genus *Vittiger** from Peru. This genus closely resembles *punctifer* in the arrangement of the thoracic pilosity, antennal structure, and venation. The principal differences between the two genera lie in the position of the antennæ, which in *Vittiger* are inserted below the middle of the head, in profile, while in *Eupachygaster* they are at the middle; in the form of the scutellum; and in the form of the fore legs, which in *Vittiger* are distinctly stronger than the other pairs and have the tarsi flattened, whereas in *Eupachygaster* the legs are all of equal strength.

The life history of the present species is unknown. *E. tarsalis* has been reared from larvæ found on *Pinus* in Scotland, and on *Populus* in England. Lundbeck has recorded the same species from apple and oak, while Verrall indicates that Dr. Sharp reared it from *Fagus*. The pupal case is figured by Verrall,† Figure 11 in present paper being a reproduction of that by Verrall.

*Ann. Nat. Mus. Hung., Vol. 7, 1909, p. 395.

†*British Flies*, Vol. V, Stratiomyidæ, Fig. 100, p. 75.

Neopachygaster Austen.

As indicated in the introductory remarks to this paper, *Neopachygaster* was erected for the reception of a single species, *orbitalis* Wahlberg (as *meromelæna* Perris), a species which is very closely related to *maculicornis* Hine, considered congeneric with it by the present writer. It is not difficult to separate the genus from *Pachygaster* in the male sex, as the eyes in the latter are contiguous above, but the females are very much alike, both having the eyes separated, and more obscure characters must be used to separate this sex. Austen has used the form of the posterior orbits as the character for the separation of the females, stating that in *Pachygaster* these are produced in the form of a "prominent ridge," while in *Neopachygaster* they are not. It is apparent from the figures given by Verrall that what Austen referred to, unless he was using *minutissimus* for comparison, was the distinct production of the posterior orbits on their lower half, which is almost indistinguishable in *Neopachygaster*. A character which very probably holds good and is of considerable value also, though not mentioned by Austen, is the shape of the head, which in *Pachygaster atra* Meigen is elongate, the eye being longer than high, while in *Neopachygaster orbitalis* it is short, the eye being distinctly higher than long. Unfortunately, it is not possible to use this character here unless one is prepared to erect a new genus for *pulcher* Loew, as this species has the eyes of the male contiguous above and the head higher than long, i. e., intermediate between *Pachygaster* and *Neopachygaster*. For a discussion of this point see under *Pachygaster*. It is not clear whether in *orbitalis* the dark mark on the antennæ is of the same nature as in *maculicornis*—glossy and possibly of a sensory nature—though Austen's description leads me to infer that it is. If this supposition is correct the presence of this mark or organ on the antennæ might be used as a character for the separation of the genera in both sexes.

Neopachygaster maculicornis Hine.*

Male.—Glossy black. Head black, eyes in life with a purple tinge; antennæ yellow, a conspicuous glossy dark brown spot on inner surface of third (complex) joint; depressions above antennæ and the lateral

*Ohio Naturalist, Vol. 2, 1902, p. 228 (*Pachygaster*).

margins of face with distinct silvery pile; proboscis yellowish apically, brown basally. Mesonotum with silvery hairs which are very dense, backwardly directed, and decumbent; pleuræ with a vertical stripe of silvery hairs on center; scutellum with less conspicuous hairs than mesonotum. Abdomen with short whitish hairs, which are much more sparse than those on thorax. Legs yellow, coxæ, except at apices, and femora, except at bases and apices, blackish brown. Wings clear, veins yellowish. Halteres yellow, knobs white.

Frons about a fifth the width of the head, parallel-sided from posterior ocelli to a short distance above antennæ, where it widens gradually; ocelli situated on a slight prominence; antennæ small, third joint disclike, the glossy area on inner side very noticeable; arista slender, bare, apical; eyes bare. Thorax with distinct suture on each side at middle, the portions immediately posterior to suture distinctly swollen; process in front of wing-base distinct; scutellum directed slightly upward, blunt apically, and unarmed. Abdomen broader than long, segments poorly defined; hypopygium small, generally protruded. Legs slender, tarsi not thickened. Apex of discal cell slightly proximate of apex of stigma, distance from fork of third vein to apex of latter about equal to preceding section of costa.

Female.—Differs from the male in having the frons slightly wider, the antennæ appreciably larger, profile (as in Fig. 16), the thoracic dorsal pilosity shorter and brassy in color, except anteriorly on the sides, and in being slightly larger.

Length, male, 2–2.5 mm.; female, 2.5–3.5 mm.

Originally described by Hine from Onaga, Kansas, and doubtfully referred to *Pachygaster*. I have examined one of the paratypes. I have seen examples from Havana, Ill., taken on the Illinois River bottoms June 19, 1909; from Plainview, Ill., in apple orchard, May 3, 1915 (J. R. Malloch); from Lafayette, Ind., June 6 and July 24 and 26 (J. M. Aldrich); from Ithaca, N. Y., July 15, 1907 (A. D. MacGillivray); from Lincoln, Neb., marked "bred from *Pulvinaria innumerabilis*;" and five specimens from the series of *Pachygaster pulcher* in the Museum of Comparative Zoology at Cambridge, Mass., two females of which bear the label D. C., one labeled "Loew coll.," the other, "pulcher" and "O. Sacken," and two males and one female without locality labels, one bearing the number 77, and all three with the label "Loew coll."

As pointed out by Aldrich in his "Catalogue of North American Diptera" (p. 192), Loew had two species before him when he described *Pachygaster pulcher*—a fact which invalidates his description of the female. The description of the male was drawn from the specimen bearing the type label, and this

is accepted as Loew's species. (An examination of Loew's material disclosed the fact that he had 3 species—or at least there are now three—in his type series).

The record on the Nebraska specimen, given above, is undoubtedly an error, the larvæ having fed in the bark of the tree on which the *Pulvinaria* were, and not on the insects.

Neopachygaster orbitalis was reared from larvæ found in a decaying holly tree (*Ilex*) at Lyndhurst, New Forest, England, by Dr. D. Sharp on several occasions. Wahlberg's record "Hab. in ligno Populi caseo ad Gusum Ostrogothiæ" has been supposed to indicate that he reared the species from poplar, but nothing definite is known on the point. Verrall suggests that the species may be found upon holly exclusively.

EXPLANATION OF PLATE XXV.

- Fig. 1. *Pachygaster pulcher*, head in profile, female.
- Fig. 2. *Pachygaster pulcher*, head in profile, male.
- Fig. 3. *Zabrachia polita*, head in profile, male.
- Fig. 4. *Zabrachia polita*, head in profile, female.
- Fig. 5. *Johnsonomyia aldrichi*, scutellum in profile, male.
- Fig. 6. *Zabrachia polita*, wing.
- Fig. 7. *Eupachygaster punctifer*, antenna of female.
- Fig. 8. *Eupachygaster punctifer*, scutellum in profile, female.
- Fig. 9. *Zabrachia polita*, pupal exuvia, dorsal view.
- Fig. 10. *Zabrachia polita* pupal exuvia, ventral view.
- Fig. 11. *Eupachygaster tarsalis*, pupal exuvia, dorsal view.
- Fig. 12. *Neopachygaster orbitalis*, pupa, dorsal view.
- Fig. 13. *Eupachygaster punctifer*, head in profile, female.
- Fig. 14. *Johnsonomyia aldrichi*, head in profile, female.
- Fig. 15. *Johnsonomyia aldrichi*, head in profile, male.
- Fig. 16. *Neopachygaster maculicornis*, head in profile, female.

Figs. 11 and 12 are copied from Verrall's British Flies, the others are original.